Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Format of R-MAP within RS-Zone
Date Submitted	2007-03-12
Source(s)	Hang Zhang, Peiying Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, Derek Yu, Mark Naden, G.Q. Wang Nortel 3500 Carling Avenue Ottawa, Ontario K2H 8E9 Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Chih-Chiang Hsieh, Yung-Ting Lee, Frank C.D. Tsai, Heng-Iang Hsu, Youn-Tai Lee Institute for Information Industry 8F, No. 218, Sec. 2, Dunhua S. Rd., Taipei City 106, Taiwan, ROC.	Voice: +1 613 7631315 [mailto:wentong@nortel.com] [mailto:pyzhu@nortel.com] loa@nmi.iii.org.tw
Re:	A response to a Call for Technical Proposal, http://www.ieee802.org/16/relay/docs/80216j-07_007r2.pdf
Abstract	R-MAP in RS_Zone is used for a parent station (MR-BS or RS) to signal the resource assignment in the RS_Zone. This contribution propose the format of R-MAP in RS_Zone.
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r2)
Notice	
Release	
Patent Policy and	

Procedures

applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

R-MAP Within RS_Zone

Hang Zhang, Peiying Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, Derek Yu, Mark Naden, G.Q. Wang

Nortel

Kanchei (Ken) Loa, Yi-Hsueh Tsai, Shiann-Tsong Sheu, Hua-Chiang Yin, Chih-Chiang Hsieh, Yung-Ting Lee, Frank C.D. Tsai, Heng-Iang Hsu, Youn-Tai Lee

Institute for Information Industry

1. Introduction

R-MAP in RS_Zone is used for a parent station (MR-BS or RS) to signal the resource assignment in the RS_Zone. This contribution is addressing the format of R-MAP in RS_Zone.

2. Proposal

As agreed in the session #46, resource assignment will be done by R-MAP. Theoretically, we can use the similar format of DL-MAP/UL-MAP as defined in IEEE802.16e-2005 for R-MAP. However, this is not very efficient resource assignment for relay station due to the following difference between the assignment to RS and to MS:
- In general, one MR-BS or parent BS serves small number of RS(s), therefore, it is not necessary to have a long CID for resource assignment. Each RS may be addressed by RSID (e.g., 8 bits) which is shorter id than CID used for MS to reduce MAC overhead.
- RS traffic is less burst and amount of traffic is larger than that of a MS due to the fact that the traffic of a RS is the aggregated traffic of multiple MS(s) – Resource granularity could be larger than a slot.
- The link between MR-BS and RS are usually more reliable, so adaptive Modulation/coding rate instead of fixed rate could be used for R-MAP. The coding/modulation could be signaled by R-FCH [1].
- The assignment to a RS could include both DL and UL assignments due to the same fact in bullet 2

Based on above, we propose the following design principles for R-MAP:

- R-MAP is used for the following purposes
    - Unicast resource assignment (unicast RSID)
    - Broadcast resource assignment (broadcast RSID)
- Resource assigned by using basic resource unit BRU (combining multiple slots) or region
    - BRU definition can be broadcast using a R-MAP IE – RS_Zone BAU config IE
    - Region definition can be broadcast using R-MAP IE- RS_Zone region config IE

o   Resource assignment is on BRU level or region level
- For most frequently used unicast resource assignment IE a format as concise as possible shall be defined to reduce unnecessary overhead – we propose a fixed length IE for this.
- Vaiable R-MAP length
- Adaptive coding/modulation for R-MAP
- Only define R-MAP without distinguishing DL R-MAP and UL R-MAP

3. Proposed text change

+++++++++++++++++++++ Start Text +++++++++++++++++++++++++++++++++

3.1 R-MAP message

[Modify the last row in Table 14 in page 4 as follows]

Type	Message name	Message description	Connection
~~68–255~~ 68	RS_MAP	Resource assignment message transmitted in RS_Zone	Broadcast
69-255		Reserved	

[Add new subclause 6.3.2.3.65]

6.3.2.3.65 R-MAP message

This massage is used for a parent station (MR-BS or RS) to signal the resource assignments to its child RS(s). This message shall be sent within DL RS_Zone. The length and modulation and coding rate are indicated in R-FCH. The message format is shown in Table xxx

Table XXX. R-MAP Message Format.

Syntax	Size	Notes
R-MAP format {		
Management message type = 67	8 bits	
Number of IEs	4 bits	Indicates the number of IEs included
For (i = 0; i<Number of IEs; i++) {		
R-MAP_IE	Variable	
}		
}		

[Add new subclause 8.4.5.9]

8.4.5.9 R-MAP IE

In this section, various R-MAP IE formats are described.

8.4.5.9.1 RS_Zone BAU configuration IE

This IE is used for a parent RS to broadcast to its child RS the RS_Zone related configurations valid from N th frame count from the current frame. These configurations include the locations of DL RS_Zone and UL RS_Zone and the BRU definition within each of DL and UL RS_Zone. The corresponding BAU assignment IE uses BAU as basic RS resource assignment unit.

Table XXX. RS_Zone BAU_Configuation IE format.

Syntax	Size	Notes
RS_Zone_BAU_Configuration_IE {		
Type	4 bits	0x00
Length	4 bits	Length in byte
OFDM symbol index for DL RS_Zone	8 bits	Indicate the OFDM symbol index starting a DL RS_Zone
Number of OFDM symbols	4 bits	Indicate the number of OFDM symbols a DL RS_Zone occupies
DL BAU	4 bits	Indicate the number of subchannels a DL BRU includes
OFDM symbol index for UL RS_Zone	8 bits	Indicate the OFDM symbol index starting a UL RS_Zone
Number of OFDM symbols	4 bits	Indicate the number of OFDM symbols a UL RS_Zone occupies
UL BRU	4 bits	Indicate the number of slots a UL BRU includes
Number of frames before effective	4 bits	Indicates the number of frames before the configuration takes effect (starting from the current frame)
}		

8.4.5.9.2 RS_Zone region configuration IE

This IE is used for a parent RS to broadcast to its child RS the RS_Zone related configurations valid from N[th] frame count from the current frame. These configurations include the locations of DL RS_Zone and UL RS_Zone and the region definition within each of DL and UL RS_Zone.

Table XXX. RS_Zone region_Configuation IE format.

Syntax	Size	Notes
RS_Zone_region_Configuration_IE {		
Type	4 bits	0x00
Length	4 bits	Length in byte
OFDM symbol index for DL RS_Zone	8 bits	Indicate the OFDM symbol index starting a DL RS_Zone
Number of OFDM symbols	4 bits	Indicate the number of OFDM symbols a DL RS_Zone occupies
Number of DL region	6 bits	Indicates the number of regions defined in DL

Syntax	Size	Notes
		RS_zone
For (i =0;i<Number of region;i++) {		
Number of subchannels }	4 bits	Indicate the number of subchannels the region includes
OFDM symbol index for UL RS_Zone	8 bits	Indicate the OFDM symbol index starting a UL RS_Zone
Number of OFDM symbols	4 bits	Indicate the number of OFDM symbols a UL RS_Zone occupys
Number of UL region	6 bits	
For (i =0;i<Number of region;i++) {		
Number of slots }	4 bits	Indicate the number of slots the region includes
Number of frames before effective	4 bits	Indicates the number of frames before the configuration takes effect (starting from the current frame)
}		

8.4.5.9.3 BAU Resource assignment IE

This IE is used for resource assignment to a RS or multiple RS using BAU as RS resource assignment unit.

Table XXX. RS_assignment IE format.

Syntax	Size	Notes
RS BAU assignment IE {		
Type	4 bits	0x01
RSID	8 bits	
Number of DL BRU	6 bits	
DL MCS	4 bits	
Number of UL BRU	6 bits	
UL MCS	4 bits	
}		

The BAU size referred in this IE is a system parameter broadcast in RS zone BAU configuration IE.
This IE is length of 4 bytes and no length field is needed.

8.4.5.9.4 Region resource assignment IE

This IE is used for resource assignment to a RS or multiple RS using region as RS resource assignment unit.

Table XXX. RS_Assignment IE Format.

Syntax	Size	Notes
RS assignment IE {		
Type	4 bits	0x01
RSID	8 bits	
DL region ID	6 bits	
DL MCS	4 bits	

UL region ID	6 bits	
UL MCS	4 bits	
}		

The region referred by this IE is defined and broadcast in RS zone region configuration IE.
This IE is length of 4 bytes and no length field is needed.

Reference

[1] IEEE C80216j-06/233: "Frame Structure to Support Relay Node Operations",